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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,266	09/11/2003	Kazuaki Sumita	0171-1015P	3533
2292	7590	12/23/2005	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			SELLERS, ROBERT E	
			ART UNIT	PAPER NUMBER
			1712	

DATE MAILED: 12/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/659,266

Applicant(s)

SUMITA ET AL.

Examiner

Robert Sellers

Art Unit

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) 2 and 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/11/2003.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

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1. The election with traverse of Group I in the reply filed on November 8, 2005 is acknowledged. The traversal is on the ground that the Group I and Group II is so interlinked that they are properly examined together. This is not found persuasive because the additional silicone-modified resin of Group II requires further consideration in different classifications, thereby confirming a more burdensome search.

The requirement is still deemed proper and is therefore made FINAL.

Claims 2 and 6 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

2. The molecular formula of Diamine-3 on page 14 of the specification contains an incorrect number of hydrogen atoms. The proper formula is  $C_{33}H_{38}N_2O_2$ .

3. The amomatic amine curing agent (B) in claim 1 is more limited than its description on page 4, lines 7-9 of the specification. The requirement for "a phenolic hydroxyl group" confines the curing agent to one phenolic hydroxyl group, whereas the disclosure sets forth "one or more phenolic hydroxyl groups."

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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4. The term "type" used to characterize the bisphenol F epoxy resin embraces derivatives and modifications not contemplated and should be stricken.
5. The tetraethyldiaminophenylmethane as component (B) does not conform to the definition of aromatic amine curing agent (B) in claim 1 since there is no phenolic hydroxyl group therein.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by CAPLUS accession no. 1973:17719 to Lapitskii et al. or Soviet Union Patent No. 1,004,411 or Koyama et al. Patent No. 4,476,277 or Soviet Union Patent Nos. 896,033 or 896,035 or 887,595 or 687,034 or 358,335.

6. Lapitskii et al. describes an electrical insulation coating comprising a liquid epoxy resin, an aniline-phenol-formaldehyde resin and quartz filler.
7. Soviet Union '411 sets forth a composition containing a liquid bisphenol A epoxy resin, a phenol-aniline-formaldehyde resin and ferric oxide and glass fiber fillers.
8. Koyama et al. (col. 3, line 59 to col. 4, line 7) reports a blend prepared from a liquid epoxy resin (col. 17, lines 19-25 and 42 and col. 54, Example 54, lines 12-14), a phenol-formaldehyde-aniline condensate (col. 36, lines 8-11 and col. 37, Table 13, Run No. 146) and glass staples or silica as a filler.

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9. Soviet Union '033 discloses a composition derived from a liquid bisphenol S diglycidyl ether, an aniline-formaldehyde-phenol hardener and glass fiber filler.
10. Soviet Union '035 espouses a mixture of a liquid bisphenol S diglycidyl ether, an aniline-formaldehyde-phenol hardener and glass fiber filler.
11. Soviet Union '595 is directed to a formulation obtained from an epoxy resin, an aromatic polyamine and a phenol-aniline-formaldehyde resin as the hardener and glass fiber filler.
12. Soviet Union '034 is drawn to a combination of an epoxy resin, an aminophenol crosslinking agent and a mineral filler.
13. Soviet Union '335 refers to a composition prepared from an epoxy resin, a mixture of phenylamine-formaldehyde condensate and aminophenol as the curing agent and glass fiber filler (Derwent abstract, last two lines).

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Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent No. 9-31406.

14. Japanese '406 a coating for electronic parts produced from a liquid bisphenol F epoxy resin (translation, page 2, paragraph 9, line 3), an aniline-modified phenolic resin, and spherical silica (page 2, paragraph 12, line 2).

15. The phenol-formaldehyde-aniline resins of each of the references except for Soviet Union '034 possesses a structure wherein the aromatic amine of aniline and phenol are linked via methylene groups emanating from the formaldehyde, thereby conforming to the claimed curing agent (B) requiring aromatic amine and phenolic moieties in the skeleton. The aminophenol crosslinking agent of Soviet Union '034 or '335 contains both an aromatic amine group and a phenolic group within the same skeleton, thereby conforming to the curing agent as currently defined.

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese '406 in view of Sumita et al. Patent No. 6,479,167.

16. Japanese '406 is described in previous paragraph 14. The claimed flip chip semiconductor using the composition as an underfill is not recited. Sumita et al. discloses an underfill for a flip chip semiconductor (col. 1, lines 48-49) obtained from a liquid epoxy resin (col. 2, lines 16-22) such as the especially preferred bisphenol F epoxy resin (col. 3, lines 1-2), "any known curing agent without particular limitation with respect to characteristics such as molecular structure and molecular weight, provided the compound has at least two functional groups (e.g., phenolic hydroxyl groups, amino groups, acid anhydride groups) capable of reacting with the epoxy groups on the epoxy resin (col. 3, lines 42-48)" and spherical silica which is "desirable for achieving low viscosity and high penetration (col. 4, lines 53-55)."

17. It would have been obvious to utilize the electronic part coating of Japanese '406 as the flip chip underfill of Sumita et al. in order to improve the mechanical strength.

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Claims 1, 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sumita et al. in view of Japanese '406 and Soviet Union '034.

18. The references are described hereinabove. Sumita et al. does not recite the claimed aromatic amine curing agent with a phenolic hydroxyl group. It would have been obvious to employ either the aniline-modified phenolic resin of Japanese '406 or the aminophenol or Soviet Union '034 as the curing agent of Sumita et al. in order to impart fast curability and a capability of hardening at low temperature (Japanese '406, page 2, paragraph 11), or increase the chemical resistance (Soviet Union '034).

Claims 1, 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. Patent No. 3,786,025 in view of Sumita et al.

19. Freeman et al. (col. 2, lines 37-43) reports a mixture of a reaction product of an aminonaphthalene such as the 1-amino-5-naphthol described on page 5, line 1 of the specification (col. 4, line 54 and col. 6, Table I, line 46) with an alkylol groups-containing aldehyde condensation polymer, a curing agent such as a liquid diglycidyl ether of bisphenol A (col. 5, lines 46-47) and fillers (col. 5, line 70).

20. Freeman et al. discloses fillers without indicating whether they are inorganic as claimed. Sumita et al. is previously described. It would have been obvious to use the spherical silica of Sumita et al. as the filler of Freeman et al. in order to lower the viscosity (Sumita et al., col. 4, lines 54-56).



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21. The encapsulated semiconductor device of claim 3 and the underfilled flip chip semiconductor of claim 4 are not recited. It would have been obvious to utilize the adhesive of Freeman et al. as a flip chip underfill as per Sumita et al. in order to improve the durability, strength and flexibility (Freeman et al., col. 1, lines 39-41).

22. More favorable consideration would be given with respect to each of the rejections applied hereinabove if the independent claim(s) are limited to a curing agent of general formula (1) or (2) as described on page 4, lines 9-12 and 17 to page 5, line 1. None of the curing agents used in the references conform to either of these formulae.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

23. Japanese Patent No. 58-109525 discusses the aniline-modified phenolic resin of Japanese '406 as acknowledged on page 2, paragraph 8 of Japanese '406.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Sellers whose telephone number is (571) 272-1093. The examiner can normally be reached on Monday to Friday from 9:30 to 6:00. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

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12/15/2005



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